

CLAIMS

1. A micro vial assembly for performing microwave-assisted chemical reactions on small volumes, the assembly comprising:
 - a micro-wave transparent reaction vessel (10) having an open upper end and a closed bottom end;
 - a sleeve (20) having a through hole, and an upper end supporting the upper end of the vessel;
 - a cap (40) having a through hole, and
 - a sealing diaphragm (30),whereby the cap is secured to the sleeve and clamping the diaphragm for sealing the open end of the vessel when the vessel is supported in the sleeve, the cap and diaphragm thus securing the sleeve about the vessel and the vessel extending axially through the sleeve.
2. The micro vial assembly of claim 1, wherein the upper end of the sleeve is formed circumferentially for engagement with the cap, the sleeve having a first diameter portion (D_1) running from the upper end to meet a reduced diameter portion (D_2) in the lower end of the sleeve.
3. The micro vial assembly of claim 2, wherein the portion of reduced diameter in the lower end of the sleeve is a truncated cone.
4. The micro vial assembly of any previous claim, wherein the upper end of the vessel (10) is formed with a widening portion (14,15,16) and the upper end of the sleeve (20) is formed with an end plane (21), a recess in the end plane of the sleeve (20) providing a seat (24) for receiving the widening portion of the vessel.
5. The micro vial assembly of claim 4, wherein the widening portion of the vessel (10) and the seat (24) in the end plane of the sleeve (20) are both conical in shape.
6. The micro vial assembly of any previous claim, wherein the open end of the vessel (10) is defined by a rim (16) protruding above the upper end of the sleeve (20) when the vessel is supported in the sleeve, the rim being dimensioned to be depressed in the lower side of the diaphragm (30).

7. The micro vial assembly of claim 6, wherein the rim (16) has an inner perimeter extending transversely to the diaphragm (30), sealing the open end of the vessel.
8. The micro vial assembly of claim 7, wherein the inner perimeter of the rim (16) defines a portion of the vessel cavity having a first radius r_1 , said first radius portion meeting a second portion of reducing radius r_2 , the reducing radius portion smoothly transforming into a portion of continuous radius r_2 defining a reaction chamber of the vessel cavity.
9. The micro vial assembly of any previous claim, wherein a bottom of the vessel (10) is formed through a radial compression (12) of the vessel, located above the terminal end (13) of the vessel.
10. The micro vial assembly of any previous claim, wherein the vessel (10) has an inner volume including a head-space volume which is less than 20 times that of the smallest reaction mixture volume contained in the vessel.
11. The micro vial assembly of any previous claim, wherein the vessel (10) is dimensioned for performing microwave-assisted chemical reactions on small volumes of 500 μl or less.
12. A system for performing microwave-assisted chemical reactions on small volumes, comprising a micro vial assembly (10,20,30,40) according to any previous claim 1-11.
13. The system of claim 12, wherein the outer perimeter of the sleeve (20) is dimensioned for bridging the radial distance between a wall of the vessel (10) and an entrance diameter (D) of a microwave cavity (1) in the system.
14. The use of a micro vial assembly according to any of claims 1-11 for performing microwave-assisted chemical reactions, in particular microwave-assisted organic synthesis reactions.
15. The use of a system according to any of claims 12-13 for performing microwave-assisted chemical reactions, in particular microwave-assisted organic synthesis reactions.